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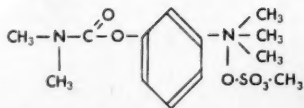
Editorials

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EDITORIALS

Immunization Against Cancer a Possibility

IT appears that Krashennikov, Russian surgeon, in collaboration with Gamaleia and Muromtsev, has succeeded in effecting apparent cures of cancer by implanting small portions (1-2 grams) of cancerous tissue, preferably from a metastatic source, wrapped in strips of omentum, into the lower abdominal wall. The material used was from the particular patient concerned, not from any foreign source. Both implant and original growth retrogressed simultaneously and rather promptly. It would seem that the autovaccine greatly increases the ability of the organism to combat the cancer.

In the MEDICAL TIMES of October, 1943 we said that "as things diagnostic are now, we do not, and cannot, as a rule, discover and deal with clinical malignancy of major potentiality early enough. Perhaps we shall have to create this early phase ourselves and, after the establishment of the regressive mechanism [resistance], invoke the same methods of cure that we now employ later than we think. The [intentional] initiation of cancerous growth may some day enable us to control absolutely the time factor, assuming that the presence of such growth for a reasonable length of time (yet to be learned) will perhaps permanently establish resistance to the type of cancer cells employed. Removal or irradiation or both before the time deadline may leave the body conditioned against the particular type of malignancy concerned. Pluripotent methods of attack may yet be possible, embracing the principal types of cancer. . . . The matter would seem to lend itself to animal experimentation based on a new premise—the artificial creation of really manageable malignancy."



Embarrassing Publicity, via Europe

THE advocates of euthanasia in this country are irked, to say the least, that their precious cause is getting so much embarrass-

ing advertisement by reason of the indictment and trial of the German doctors who applied it on a grandiose scale. Denial that their program aims at the crippled, the incurably ill and the insane and affirmation that it is concerned only with suffering constitute a naive alibi. The Nazis began their program with that sophistry. Nothing conceivable is more likely to eventuate in abuse than euthanasia.

European experience with euthanasia is enlightening, just as European experience with socialized medicine has been. We want neither of them in this country.

New Deal: Argentine Style

WITH Perón at the Argentine helm, the State, under a five-year scheme, is planning to institute control, among numerous other things, of medicine and the manufacture and sale of pharmaceuticals. The principle to be followed by the State consists of "taking products and selling them in the manner that it considers best suited to the interests of the nation."

So, drugs will be produced by the State and sold at cost. State control over physicians, producers of medical service and health, will be established, with distribution and pay a matter of governmental regulation.

Once upon a time we used to marvel at the imaginativeness of an H. G. Wells as a writer about things Utopian and fantastic, but today the politicians have taken over and truth is indeed becoming stranger than fiction.

God help all trusting guinea-pigs.

Endemic Social Sickness

WE were pleased to note Dr. Carl Binger's protest, before the National Committee for Mental Hygiene, against the spreading of medical misinformation on the radio by certain commercial interests.

Some newspapers were open to criticism, Dr. Binger pointed out, on the ground that they made sensational headlines out of medical half-truths.

As a psychiatrist, Dr. Binger also took exception to the inaccurate presentations of "far-fetched psychiatric films."

Such Federal regulations as we have leave truth badly battered.

It is all part of the social sickness now endemic among us.

We hope to hear more from the psychiatrists. A special educational responsibility devolves upon them. They are best equipped to diagnose weird motivations. Certainly one aspect of public health is involved.



The Third American Congress on Obstetrics and Gynecology

THE Third American Congress on Obstetrics and Gynecology will be held from September 8-12, 1947 in the Municipal Auditorium in St. Louis, Missouri. The Second Congress was held in the same place in 1942 and the First Congress in Cleveland in 1939. Dr. Fred L. Adair of Chicago is again General Chairman.

While the Third Congress is similar in scope and program to the two previous meetings it will be larger in every way. The program under the direction of Dr. William F. Mengert of Dallas is being made up to appeal to the obstetric and gynecologic specialist, to the general practitioner interested in those fields, to the hospital administrator and to nurses. The program will include sections for the public health doctor and the public health nurse. The medical section of the program

War and Tropical Disease

OPINIONS differ as to the likelihood of an epidemic in this country of some transplanted tropical disease such as malaria.

From a lay source, expert in tropical affairs generally—Charles Morrow Wilson, we hear that "America stands squarely in the path of a major malaria epidemic." Mr. Wilson is perhaps best known as the author of *Ambassadors in White* (1942).

On the other hand, Dr. Francis Dieulaide, scientific director of the Life Insurance Medical Research Fund and formerly chief of the tropical diseases treatment branch of the Army Medical Department, thinks there is small danger of such an epidemic of malaria—or of any other tropical disease. "So far," he reminds us, "we have passed through two summers without change in the incidence of malaria which can be attributed to returned servicemen."

is under the direction of Dr. Ralph A. Reis of Chicago as in 1942.

The Scientific Exhibits are under the guidance of Dr. Jean Paul Pratt of Henry Ford Hospital. The Moving Picture Program is being made up by Dr. John Park of Washington, D. C. Dr. John Rock of Boston heads the Committee on Evening Speakers. The Technical Exhibit has been arranged by Dr. Philip F. Williams of Philadelphia. A Membership Committee in every state and in the territories is being set up by Dr. Ralph E. Campbell of Madison, Wisconsin and plans are underway to have a special committee build up interest in the Congress in Central and South America. Dr. Harvey B. Matthews of Brooklyn heads the committee in charge of publicity. The General Advisory Committee is in charge of Dr. Howard C. Taylor, Jr. The Local Organization Committee in St. Louis is headed by Dr. Richard Paddock.

THE SPREAD OF INFLUENZA AND ENCEPHALITIS

C. H. Andrews, F.R.S.

Member of the scientific staff of Britain's National Institute for Medical Research.

Fellow of the Royal College of Physicians.

TWO virus-diseases, or groups of diseases, may spread from country to country with unpleasant consequences—*influenza* and insect-transmitted *encephalitis*.

There are two apparently conflicting views as to the epidemiology of *influenza*, and I am beginning to suspect that both of them may comprise some of the truth. According to one view, *influenza* always reaches a country from somewhere else. Epidemics in Britain have thus been called the Russian or the Spanish or some other kind of *influenza* according to their supposed place of origin. Outbreaks in Britain usually last for at most three months and *influenza-virus A*—the more important of the two known *influenza* viruses—may not be recognized at all in Britain for the twenty-one months or so before another outbreak occurs.

Can we believe that its normal existence consists of a progression around the world, producing epidemics, passing from the northern to the southern hemisphere and back again according to season? Recorded data as to the periodicity of *influenza* in different parts of the world do not at all support such a view: epidemics in Britain, on the European continent and in North America tend to occur at about the same time but there has been no discernible regular relation to those in the southern hemisphere. Country to country spread of pandemic *influenza*, as in 1918, is another matter, to which I shall return.

The second view supposes that the *influenza* viruses are always with us, perhaps in the respiratory tracts of some people who are carriers, perhaps causing, between epidemics, subclinical infections or sporadic respiratory ailments which do not get called *influenza*. And then, after the lapse of time the immunity of the population wanes to a suitably low level, and some climatic or other as yet undefined factor

sets the stage for a greater or lesser outbreak. An argument for such a view is the occurrence, as in Britain in 1937, of a number of antigenically distinct variants of *influenza virus A*, all in one outbreak: (1) there are, too, a number of examples on record in which viruses A and B have turned up in one and the same epidemic. Shope (2) has made out a very strong case for believing in the genesis of an outbreak of swine *influenza* by simultaneous activation of latent virus in a number of separate droves of pigs.

Virus in Pig Lung Worm

THERE is good evidence that the virus may be carried in the pig lung worm; this passes part of its life cycle in earthworms; the virus may get back into the pigs' lungs when pigs eat such infested earthworms, but virus so seeded into a drove of pigs will not produce an epidemic until some outside, perhaps climatic, conditions are favorable. Then up comes the epidemic, occurring at the same time in lots of farms between which there is no contact likely to be capable of spreading the infection.

This latter view of the endogenous origin of human *influenza* epidemics seemed the more convincing. But the behavior of *influenza virus B* during the last year has raised fresh doubts. It seems that this virus gave rise to small outbreaks within the United States from March 1945 onwards (3). It began causing trouble in June 1945 in Hawaii and Guam. Thereafter it spread East, and epidemics, all mild ones, appeared in the next few months in the Caribbean area, the more northern parts of South America and in Texas. Thence a rather slower spread occurred in the United States but B was widely prevalent in that country by November.

In Europe it did not appear till Decem-

ber—in Holland and Belgium; the peak in Britain was in January. From the Pacific the virus apparently went also southwards and caused an outbreak in Australia at what is for that country an unusual time of year—November (4). There are two reasons for believing that there was a true spread over the world. First, B strains recovered recently in Australia and Britain are antigenically very closely related and decidedly different from the standard B strain Lee isolated in America in 1940 (5). Second, the disease showed rather unusual epidemiological features and those which Burnet has described from Australia are identical with those we have lately seen over here: in both countries the incidence has been very patchy but with a high incidence in schoolchildren and very little in adults, noticeably little in the army.

One wonders, therefore, whether the influenza viruses may not be endemic in every country, but at the same time so labile that they easily produce mutant forms sufficiently distinct antigenically from the stock to be able to infect a substantial number of people who are resistant to their endemic strain. Virulence might soon be raised and further extension made possible. Thus a country to country spread could be quite commonly superimposed upon endemic influenza. What has perhaps occurred during the past year with influenza B may be not unlike the happenings of 1918-19 except that in contrast to the pandemic virus, last year's antigenic variant of B caused only a mild disease, not readily differentiated from the local endemic influenzas.

International Cooperation

WE cannot find out whether there is a country to country spread as a normal occurrence unless there is cooperation between countries in collecting and comparing strains from outbreaks; and I suggested at the recent Empire Scientific Conference in London the desirability of ensuring that in every considerable region within the British Commonwealth there

were trained observers capable of collecting and comparing strains, or at least collecting and transmitting to centers where detailed comparisons might be made. I suggested that it was possible that what we might call the global epidemiology of influenza might be in a state of transition as a result of the enormous increase in air transport. If so, it is most important for us to be able to observe accurately what is happening.

We need knowledge of these and other matters if we are to be able to combat the fatal type of pandemic influenza should it return. We should like, by quarantine restrictions, to exclude a new and dangerous virus, if only to give time for making a vaccine against it. The pandemic of 1918-19 did not hit Australia until several months later than most of the world, and I understand that the Australians attribute this temporary freedom to their quarantine restrictions (6). But I have heard doubts expressed as to whether that quarantine had, in fact, anything to do with the course of events: influenza viruses, we now know, are quite frequently carried during epidemics by persons without symptoms, and the Australian quarantine was not, I should have thought, such as to prevent rather free dispersal of virus by such asymptomatic carriers.

Possibly the non-pandemic influenza prevalent in Australia in September-October 1918 conferred a temporary resistance. The question is an open one. At any rate it would be very wise for all countries to decide now, without waiting until a pandemic occurs, what quarantine measures are desirable and feasible, in the face of a disease which still has the potentiality of killing people by millions.

Insect-Transmitted Encephalitis

IN North America there exist St. Louis encephalitis and the Western and Eastern forms of equine encephalomyelitis, all of which can infect man. They concern mainly the United States but may and do spread over the border into Canada. The Americans are rightly worried about the dangers of introducing from the Far East

—Continued on page 353

RUPTURED MALARIAL SPLEEN: RESUME OF MALARIA

Adolph L. Natenshon, M.D.

Milwaukee, Wisconsin

THE following case is presented because of the rarity of ruptured malarial spleen and as an indication of the necessity for the practicing physician to be alert for tropical diseases in treating returned veterans.

Mr. J.B., aged 32, Milwaukee, Wisconsin, was seen by me on November 30th, '45. He had spent several years in the South Pacific Theater, and had been discharged about three weeks previous to my first visit. A few days previous to my call he had started to work at manual labor which required the swinging of a 20 to 25-pound sledge hammer. He went bowling that night after work.

The following day he became ill with chills, fever, cough, generalized aches and malaise. A diagnosis of influenza was made, and he was given the usual medications. He improved and got out of bed a few days later. Then I received a call on December 3rd, 1945 stating the patient felt worse after being up and around; his temperature had dropped but he had severe pain in the upper left abdomen along the costal margin. I questioned whether he had had malaria, and the family stated that he had not had malaria to the best of their knowledge. I felt this might be malaria with engorgement of the spleen causing the pain. I advised heat and paregoric, and informed them I would put the patient on quinine if his temperature rose again. He was given an enema and felt worse after it.

December 4th, 1945 I again was called to the house because of persistent pain in the left abdominal region, and a feeling of faintness when he sat up.

Temperature that morning was 100.4, pulse 100, and the abdomen was distended but patient expelled flatus freely. He complained of pain on breathing low in the back on the left side. The left side of the

abdomen was soft, but there was definite rigidity with rebound tenderness and localized pain over McBurney's point. A diagnosis of a gangrenous appendicitis was made and the patient was moved to the Mt. Sinai Hospital for immediate surgery.

Upon opening the abdomen the peritoneal cavity was filled with old blood and fresh blood. The incision was closed and another incision was made over the spleen. The spleen was soft and about 10 to 15 times normal size, and upon exploration the diaphragmatic surface was covered with fibrous adhesions, and the organ was ruptured. The spleen disintegrated and fell to pieces upon attempts to remove it, with severe bleeding. The spleen was like mush and necessitated the scooping of it out piecemeal. The vessels were ligated and the abdomen closed. During the operation the patient was given plasma, and immediately following surgery he was given a quart of whole blood. The following day another quart of whole blood was given.

At no time did the patient go into shock. Blood smears taken a few days later were positive for tertian malaria, so he was given quinine.

On December 14th, 1945 he was discharged from the hospital with slight wound drainage where the drain had been.

On December 17, 1945 he had a chill followed by a temperature of 104.1. The usual forms of treatment were given and patient felt better the next day.

On December 19th, 1945 he again had a chill in the afternoon, and by evening the temperature rose to 105.4. The quinine was increased and the next day he felt better but complained of weakness. Reticulogen was started and given every other day. The patient was given the usual supportive treatment and a maintenance dose of 5 grains of quinine after the evening meal, which is still maintained. There have been no further chills since December 19th, 1945.

Presented before the Mt. Sinai Hospital Staff.

On January 10, '46 the patient felt fine and had no complaints. Weight 175 pounds, blood pressure 130/80, urine negative, red count 4,770,000, white count 8,300.

His weight was greater than his previous weight immediately after his discharge from service.

He also stated that he had had three attacks of malaria when he was in the South Pacific, each of which lasted three days. He refused to stay in the hospital because he feared separation from his own outfit; and he saw other malaria patients in the hospital who were really sick.

I AM very glad to have this opportunity to present this case to the staff. This type of case is an example of many more that one will encounter in the near future. Not only will we see malaria and its many complications but other tropical diseases, now that men and women are returning from theaters of war scattered all over the globe. It is also a pleasure to present this patient in person instead of the pathologist's usual postmortem findings. He has been fortunate by the grace of God and because one was able to get a hospital bed; because the surgeon recognized the condition; and because intratracheal anesthesia was given by a good anesthetist so that his life was spared although an incorrect diagnosis was made on admission to the hospital. In order to treat this patient I found it necessary to do considerable reading to brush up, as I was somewhat rusty, not having seen a malaria patient for some time.

In former years in this region before the war some malaria cases were seen, those cases in which malaria was used in the treatment of latent neurosyphilis and multiple sclerosis; and cases of drug addicts who were not careful in the use of syringes without sterilization. Now since the use of hyperpyrexia by diathermy and other means, the use of malaria in treatment has fallen by the wayside.

In a recent report from the State Department of Health of Iowa the incidence of malaria in that state rose from 24 cases in 1935 to 250 cases in the first six months

of 1945. This striking increase is due largely to infection incurred outside the continental United States, affecting men serving with the armed forces, and persons in prisoner of war camps (1).

According to Snapper (2) there is not much chance of possible post-war malaria outbreaks in the United States. Acute malaria outbreaks may be favored by different conditions. The introduction of a new mosquito carrier has caused epidemics. The United States is well protected by strict antimosquito quarantine which is organized at all airports where airplanes from malarious regions arrive. Army and public health authorities have reduced the mosquito-breeding areas to a minimum, and legislation bars construction of reclamation projects which could lead to outbreaks of man-made malaria. Although a great number of returning army forces personnel may carry the sexual form of malaria plasmodia in their peripheral bloodstream, there is little danger of epidemics as long as public health measures against malaria continue. The use of D.D.T. will help to get rid of the mosquito menace.

Malaria is an infectious disease caused by the bite of the female of certain mosquitoes of the subfamily Anophelinae in whose body the organism passes a part of its life cycle (3). It is the most important disease, infectious and noninfectious, with which mankind has to contend, for it kills more people than any other and tremendously curtails the social and economic efficiency of those who survive. According to recent estimates 800,000,000 people suffer from this disease. In India alone it causes one million deaths a year (4). Recent reports from the Pacific area reveal that 50 to 65 per cent of military personnel have become infected with malaria, as determined by positive blood smears. Of these 35 per cent have benign tertian and 65 per cent have malignant tertian malaria.

There are Several Organisms:

Plasmodium vivax causes the tertian type. *Plasmodium malariae* causes the quartan type.

Plasmodium falciparum is the cause of the estivo-autumnal type or malignant tertian.

These organisms live in two forms, and have two cycles in their existence, the cycle occurring in man, and the extracorporeal cycle in mosquitoes.

The Plasmodium in man lives in the red blood cells. The *Plasmodium vivax* is ameboid, while the others are regular in shape. In the early stages, these parasites appear in small signet rings in the red blood cells. In about 15 hours, black pigment granules called Schueffner's granules appear in the parasite. These bits of pigment (part of the parasite) are actively motile and apparently consume the red blood cells as the parasite grows.

At first there is a nucleus in the red blood cell. Soon it becomes polymorphous in shape and divides. At the end of the development period, which varies from 30 to 72 hours depending on the type of organism, the size of the newly formed parasite is almost equal to the red blood corpuscle, of which a shell or thin rim around the parasite remains. Soon the parasite divides into multiple subdivisions, each with a nucleus, all contained within the corpuscle. This mature form is called the rosette, and it consists of 18-32 young parasites or merozoites that have matured and divided by segmentation.

At the end of the development period, the red cell bursts, and the merozoites get into the blood stream and float around freely until they enter another red blood cell to start a repetition of this cycle. Not every merozoite penetrates into red cells. They are very susceptible to the phagocytes of the blood, and most of them are destroyed, but a certain number survive to carry on the cycle. Most of the parasites exist in the capillary portion of the vascular system where the blood is moving most slowly. When many parasites reach full development at the same time, typical symptoms are produced which are very regular from the standpoint of time. In the tertian type, the development occurs every 48 hours; in the quartan type, every 72 hours. There may be sexual differentiation of the parasites noted in the blood stream of man. Sexual reproduction occurs in the stomach of the *Anopheles mosquito*. The fertilized zygote penetrates the stomach

wall in the abdominal cavity of the mosquito. Growth occurs and a large cyst forms which finally bursts and liberates the sporozoites. These are carried to the salivary glands of the mosquito and are inoculated into the next human the mosquito bites, to start the cycle again. It is characteristic of the *Anopheles* mosquito which has bitten a person to return to this person to fill its stomach with blood again. It has been shown that only the female mosquito bites.

The outstanding Pathological Features of Malaria follow:

The Liver may be enlarged and congested, especially in fatal cases.

The Kidney may be congested, and there may be hemorrhages into the parenchyma. The tubules are filled with casts, which may explain the urinary suppression that occurs in fulminating cases.

The Brain is like the spleen, gray or slate colored. Hemorrhages and numerous thrombi may be present. The capillaries are very frequently occluded by parasites. *Capillary Occlusion* in various organs such as the spleen, liver, kidneys, bone marrow, and brain may be present. A theory for the symptoms is that a *Toxin* is formed and liberated. As a result the patient has a chill and a fever.

The Splenic Enlargement depends on the severity and the duration of the disease (5). The spleen is always enlarged in proportion to the duration of the disease and the type of infection. Tertian fever causes the greatest enlargement; estivo-autumnal the least. In the spleens of individuals who have died from other diseases, but who have had associated latent malaria, parasites and pigments are always present. Smears of pulp contain enormous numbers of parasites, red cell debris, and pigment much of which is in the mononuclear cells. It has been long known that the spleen is not an organ necessary for life; in fact the ancients, on the erroneous supposition that the speedy giraffe did not possess a spleen, are said to have excised the spleen of runners in order to increase their efficiency. In a few cases the spleen has been found to be completely absent, usually when there are other anomalies.

The spleen as an important member of the hemolytopoietic system, is unquestionably concerned with blood cell formation and destruction. Like the liver it may easily revert to the embryonic function of forming leukocytes and monocytes in common with other tissues. The fact that phagocytosis of cell debris, or if necessary, of whole cells, takes place not only in the spleen, but also in the other parts of the reticulo-endothelial system, may be taken as an explanation of the rapid accommodation that occurs after splenectomy.

Most evidence indicates that the spleen plays a role of clinical importance in relation to immunity. It has a selective affinity for bacteria, fixes toxins, and produces antibodies; but here also the spleen cooperates with other tissues which can quickly assume these functions after its removal.

Traumatic rupture of a normal spleen is possible although this accident is usually found to occur in an organ that is diseased. Rupture occurs more commonly in malarial splenomegaly, and may take place spontaneously during typhoid fever, especially if malaria has caused enlargement or torsion of the pedicle. Thrombosis of the splenic artery may be followed by subcapsular hematoma with rupture. The usual symptoms of rupture are sudden agonizing abdominal pain, signs of shock, fever, and vomiting with signs of internal hemorrhage. Rapidly increasing anemia and marked leukocytosis may ensue. Torsion of the pedicle will produce the same symptoms but the findings of internal hemorrhage do not occur. If rupture of the spleen is secondary to an infarct or abscess the symptoms of the primary cause are added and signs of general peritonitis soon develop. The treatment for ruptured spleen is immediate surgical removal. This patient did not manifest at any time any shock picture, nor any evidence of severe internal bleeding. In fact during the operation his blood pressure at one time was 150/80. The spleen in malaria becomes a reservoir which resists specific treatment and permits the continuance of the disease. In malaria, the spleen, because of its function in destroying red blood cells, is ex-

posed to infection by the organisms which it liberates. The large, hard, pigment-laden spleen of chronic malaria apparently does not rupture easily but many complex and numerous adhesions may form around the spleen which make surgical removal difficult.

In speaking to men who have been in the army, and have seen much malaria, I learn that many have seen no cases of ruptured spleen. Dr. M. Hardgrove, who has been medical director in army hospitals in Panama, stated he had seen 4000 cases of malaria in the last two years but only two cases of ruptured spleen. It is peculiar that with the evidence of malaria in the army, and the possibility of injuries which might be sustained, so few cases are noted. Perhaps there are many cases; in the field many deaths may have occurred and have been thought to be the result of other battle injuries. In the navy, it would be interesting to know how many ruptured spleens occur as the result of blast injuries, due to explosions, but this would be a difficult problem. Here at the Veterans' Hospital they are treating an unusually large number of malaria cases in returning veterans. Recently they had a case of ruptured spleen—spontaneous rupture in a patient who was under treatment for malaria. This patient went into shock and had pain and tenderness in the lower right quadrant. The spleen lies posteriorly and when rupture takes place the blood for some reason seems to gravitate and follows a certain course and pools usually in the lower right quadrant, causing a peritoneal irritation with localized pain, tenderness and rigidity simulating the findings in acute appendicitis. Some of the blood may get under the diaphragm, causing irritation of the diaphragm and pain at that level and on deep breathing, also shoulder pain on lying down. The physical findings localized to the right lower quadrant are therefore a good diagnostic aid when one suspects a ruptured spleen. In speaking to men who have had cases of ruptured spleen these findings were usually present, and as in this case many were opened for appendicitis.

Symptomatology of malaria is relatively simple and characteristic and varies with the type of organism. Malarial fever may be divided into two types: the regular intermittent and the remittent fever.

The *regular Intermittent Fever* is the type seen in the tertian and quartan forms. This consists of a regular syndrome of chills, fever and sweats.

The *Incubation Period* following the mosquito bite lasts from 1½ to 15 days. Usually the patient has some kind of an *Aura* before the chills such as a headache, an uneasy sensation, lassitude, yawning, nausea, and vomiting; all are evidence of release of the so-called toxins. Rectal temperatures reveal that just before the *Chills* occur the patient develops a fever. At the start, the patient begins to shiver. As the chill increases, he shivers more and more. The shaking is very severe. The patient is blue with cold, and the temperature of the skin drops. However, the rectal temperature rises. In children, there may be delirium and convulsions. The chill may last a few minutes or hours. It is followed by

Fever which rises rapidly. The skin becomes warmer and warmer until it is hot. The face is flushed. The pulse is full and is typical of that of a high fever. The patient develops a headache, and some patients become delirious. Thirst is very marked. The fever may last from a few minutes to several hours and is followed by *Sweats*. After the period of perspiration, the patient feels better and falls into a period of

Refreshing sleep, from which he awakens feeling vastly improved. These attacks usually occur in the morning, sometimes in the afternoon, and rarely at night. The whole attack usually takes from 6-10 hours. In the tertian type, an attack occurs every other day; in a quartan case, every third day. There may be double infections or combinations of two types of infection. With a double tertian infection one might get an attack every day. With a combination of tertian and quartan infection, one might have an attack three days in a row, skip a day, and then repeat the sequence. *Remittent fever* or continuous fever is

the type usually seen with the estivo-autumnal or malignant tertian malarial infections. This usually occurs in the late summer and early fall as the name suggests. In this type the paroxysms last longer, sometimes about 20 hours. This is the type that presents problems in differential diagnosis, and is the type that sometimes causes death in malaria.

D. G. Ferreman (6) reports experience with over 2000 cases of malaria, almost all malignant tertian in white personnel in West Africa. Malignant tertian malaria mimics many diseases and is a dangerous condition; therefore it demands early diagnosis and treatment. In low fever cases slides taken beyond 48 hours were of no diagnostic value. Slides taken night and morning for 48 hours in high fever cases, even though treatment may have been started, reveal the parasites in many instances.

Dr. Ferreman states splenomegaly was strongly indicative of the condition; tenderness of the spleen was virtually pathognomonic, and definite tenderness under the left costal margin, in the absence of a palpable spleen, is of great diagnostic value.

Many cases were of a constitutional nature only, with headache, backache, aching limbs, dry cough, vomiting, fever, splenomegaly and herpes as symptoms. This type of case constitutes about 84 per cent of the total.

The term subclinical malaria is applied to a condition seen in ambulant personnel. Chief complaints were recurrent headache, backache, aching limbs and malaise. A sense of well being after treatment is a notable feature. Splenomegaly occurred in about one-third of the cases, and slight pyrexia was probably present. The general condition is good, and there is no anemia. Blood slides are usually negative. Response to antimalarial treatment is good. There are various forms. There is the so-called *Comatose Form*, sometimes called pernicious malarial fever, in which the symptoms are chiefly those of the central nervous system. The patient is struck down with symptoms referable to the brain and spinal cord. The patient rapidly goes into

coma. Chills may be present. The fever is high, and the coma may last 12-24 hours. At autopsy, one sees the capillaries of the brain plugged by parasites; 50 per cent of the cases of malaria which die are of this type. In the

Algid or Gastro-Intestinal Type the temperature may be subnormal. The patient simply becomes prostrated and dies of weakness. Vomiting and diarrhea are outstanding symptoms. Occasionally one sees the

Hemorrhagic Type. As a result of destruction of red blood cells, the patient develops a hemoglobinuria. This occurs only in fulminating cases and in patients who are not treated properly. Chills are usually very severe, but the fever is not very high. Soon after the chill, the urine becomes colored deep red or black. It soon clears up until the next attack. There may be a suppression of urine due to plugging of the tubules of the kidneys by parasites. These are cases of a true erythrocytic hemoglobinuria. Quinine should be withheld here because it favors hemolysis of the red blood cells.

Malarial Cachexia is a rare state which may occur in long standing cases. It is characterized by dyspnea on exertion, swelling of the ankles, hemorrhages, especially into the retina, and an enlarged spleen. The prognosis in these cases is usually good. An almost constant finding in malaria is

The Enlarged Spleen, and also quite constant are the

Blood Findings. It is not enough to examine the blood for parasites in a suspicious case. There are other significant blood findings.

Anemia may become very profound, and the patient may seek medical advice primarily for the anemia. The erythrocytes may number as few as 1,000,000.

Leukopenia is also very common. Usually before the chill the count goes to 15,000, mostly monocytes, and drops after the chill. One can demonstrate the

Organisms with Wright's stain, or by using a Romanowsky stain. One must make an effort to get a good red cell stain, and avoid getting any deposits on the slide

such as frequently occur in stains of poor quality. With Wright's stain plasmodia appear as bluish bodies within the red cells. The

Plasmodium vivax is ameboid, while the *Plasmodium malariae* and *Plasmodium falciparum* are regular forms. The latter is usually crescent-shaped and may stand out so clearly that the surrounding cell is barely seen.

Sternal puncture is valuable in the diagnosis of latent malaria presenting obscure illness and may provide a positive diagnosis for some obscure case. Most pyrexial malaria can be diagnosed by blood smears, but sternal puncture offers a supplement (7).

Reapses may occur any time, and may be caused by

Injury, high altitude flying, chilling, mountain climbing, exposure to the sun or cold, alcohol, errors of diet, surgical operation and childbirth. Certain substances known as provocatives when injected tend to bring about the liberation into the blood stream of parasites harbored in the internal organs: arsenicals, strychnine, adrenalin, and ultra-violet light.

Reinfections are quite common, especially in patients who live in warmer climates.

The Diagnosis of malaria directly is based on a history of the occurrence of the regular paroxysms in a patient who has been exposed to mosquitoes, on the physical findings, chiefly of an enlarged spleen, and—most important—on the demonstration of organisms in the blood. A few grains of quinine may be all that is necessary to stop the disease, but the therapeutic test of quinine is not diagnostic. This drug may also stop other fevers. Quinine is best avoided until after the diagnosis is settled, since if more quinine is given it is seldom possible to demonstrate the organisms.

The Differential Diagnosis of malaria is usually not difficult. Most of the cases are first diagnosed as

Influenza. The patient has a fever, for a short time with chills. An influenza patient does not have chills at regular intervals. He may have leukopenia, but the spleen is not enlarged. Influenza is a self-limited disease.

In the Differential Diagnosis of Prolonged Fevers, typhoid fever, the various types of pneumonias, sepsis, especially subacute bacterial endocarditis, miliary tuberculosis, and sometimes trichinosis must be ruled out. In addition, one must consider various causes of

Splenic Enlargements. A malarial spleen is hard, and is quite different from the spleen of typhoid, which is soft and mushy.

Acute Splenomegaly

Typhoid Fever
Paratyphoid Fever
Malta Fever
Septicemia
Tuberculosis, miliary
Influenza
Toxic states

Chronic Splenomegaly

Leukemia	Cysts of the Spleen
Banti's disease	Gaucher's Disease
Von Jaksch's Anemia	Hodgkin's Disease
Still's Disease	Cirrhosis
Neoplasms	Kala-Azar
Polycythemia	Rickets
Tuberculosis	
Amyloid disease	

The blood picture often helps make the differentiation between the various splenic enlargements. A leukopenia is common in splenic disease, and therefore is not very valuable from the standpoint of differential diagnosis.

The Prognosis of malaria is very good. In fact, the percentage of recovery is close to 100 per cent. In the pernicious type, the outlook is more doubtful and, in the presence of hemoglobinuria, the prognosis is grave. The mortality in the countries in the malaria belt is only 3 per cent for cases of all types.

Treatments: The ideal drug for malaria therapy has not been found and there is no general agreement about treatment. This might be expected in view of the great variety of parasitic strains, wide difference between benign tertian and malignant tertian malaria, and additional effects of race susceptibility, acquired immunity, malnutrition and other factors. Three anti-

malarial drugs have been tested and used successfully: the cinchona alkaloids of which quinine is best known, and the synthetics, atabrine and plasmochin. Atabrine is the only substitute for quinine, because plasmochin is useful only for specific destruction of the gametocytes or sexual forms of malignant tertian malaria that lead to infection of anopheline mosquitoes and transmission of the disease (8).

Drug suppressive treatment is an emergency procedure which should be used only when troops must accomplish a mission in an area where there is a substantial risk from malaria and where mosquito control is not possible. There is no drug known which in safe doses will prevent mosquito-borne infection with malaria. However, atabrine taken regularly in proper doses suppresses clinical symptoms for varying periods and enables men to remain active despite infection which otherwise would incapacitate (9).

If suppressive treatment is discontinued most infected men will develop malaria within two or three weeks (4). The army has considered staggering the discontinuation of suppressive treatment after the war so that the hospitals will not be overloaded with malarial recurrences. Whereas in benign tertian malaria the patient is allowed to have a few chills to establish a partial immunity and thus lessen the number of relapses, malignant tertian malaria should be treated immediately. Specific treatment varies with the severity of the disease. In uncomplicated malaria the patient is able to retain oral medication. Atabrine, considered the best agent for this type of malaria, is given in doses of three grains every six hours for five doses, followed by 1½ grains three times a day for five days. When quinine is used 15 grains are given three times a day for two days, followed by 10 grains three times a day for five days (11). Severe malaria is complicated with vomiting, coma or other serious disorders.

In any case in which the parasite density is over 100,000 or 5 per cent of erythrocytes are parasitized or fever in a falciparum infection is over 103 F., 10 grains

of quinine dihydrochloride in 200-300 cc. saline are given slowly intravenously; this is repeated in six to eight hours if necessary. Oral medication is given as soon as the patient can swallow. Atabrine is best given intramuscularly, 3 grains into each buttock and repeated in six to eight hours. Thiobismol and mapharsen have been used successfully in checking certain phases in the malarial cycle. Routine use of plasmochin is not advocated because of its toxicity and questionable results.

Quinine has not been available during the war but now it is back again. Certain patients may be sensitive to any of these drugs, and one hates to use quinine in pregnancies. Atabrine being a dye does cause a yellow discoloration of the skin, but not of the sclera.

Recent literature states, although this is not proven, that jungle rot is due to a sensitivity of certain individuals to the drug.

A patient with malaria is usually given supportive treatment as well as specific treatment. Every effort should be made to try to mitigate his discomfort during the chill stage and when he is sweating the bed linens and his nightclothing need frequent changing. Ordinary antipyretics are hardly

worth using during the fever stage, but if hyperpyrexia develops the cold pack must be employed. It is a good rule to put the patient in the pack when axillary temperature reaches 106 F. and remove it when rectal temperature is 102 F. Iron and liver may be used to overcome the anemia, and diet during the attack is no problem because the patient does not have any desire for food, and needs only the lightest nourishment.

In this particular case vitamin K was given because quinine tends to increase bleeding time when there is a tendency to bleed.

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208 EAST WISCONSIN AVENUE



American Academy of Allergy

THE American Academy of Allergy will hold its annual convention at Hotel Pennsylvania, New York City, November 25-27 inclusive. All physicians interested in allergic problems are cordially invited to attend the sessions as guests of the Academy without payment of registration fee. The program has been arranged to cover a wide variety of conditions where allergic factors may be important. Papers will be presented dealing with the latest methods of diagnosis and treatment as well as the results of investigation and research. Chairman on Arrangements, Dr. Horace S. Baldwin, 136 East 64th Street, New York City.

\$66,000,000 Paid in War Claims by the Metropolitan

THE Metropolitan Life Insurance Company has disbursed about \$66,000,000 in the payment of "War Claims" on about 75,000 deaths among its American and Canadian policyholders in World War II. This amount has been paid by the various Departments of the Company for deaths from all causes among men in service, as well as for deaths from enemy action among civilians. The account is not quite complete, because in a number of cases claims are unavoidably delayed in being forwarded to the Company.

SEARCH AND RESEARCH

Wallace Marshall, M.D., Research Editor
Mobile, Alabama

V

The Properties and Uses of Streptomycin Based on U. S. Army Clinical Experiences

IN July, 1945, a study of streptomycin in the therapy of surgical infections was begun at Halloran General Hospital and extended subsequently to include 30 other hospitals.^{1,2,3,4} It is the purpose of this paper to present a summarization of the findings in the various types of cases which included infections of the respiratory and genito-urinary tract, peritonitis, bacteremias and battle wound infections.

Streptomycin is a mold product derived from a strain of *Streptomyces griseus*. It is the result of a deliberate search for an alternative agent for infections caused by two types of organisms: (a) those which are usually sensitive to penicillin but have developed a drug-fastness; and (b) those which penicillin does not influence.

The development of penicillin was a unique achievement in that there did not previously exist any such agent which could be used up to 5000 times its bactericidal concentration without killing the patient.

Isolation

From this time on it was a wild race to duplicate this achievement with other products. Waksman and several graduate students⁵ of the Department of Microbiology of the New Jersey Agricultural Experiment Station, Rutgers University, first took stock cultures to study the production of antibiotic substances by microorganisms. They succeeded in isolating a number of substances including actinomycin, clavacin, fumigacin, chaetomin, micromonosporin, streptothricin and finally streptomycin. Of all of these streptomycin was the only one with a potent *in vitro* action with a reasonably low toxicity. It was found to be of value against penicillin-resistant and penicillinase-producing organisms.

¹From the Editorial Research Department of the MEDICAL TIMES.

Comparison with Penicillin

Streptomycin differs from penicillin in 4 outstanding ways: (a) it is less effective on Gram-positive organisms; (b) it is ineffective against anaerobic *Clostridium welchii*, *Clostridium tetani* and related organisms; and (c) it possesses a potent antibacterial effect on Gram-positive tubercle bacilli; (d) it is effective against penicillin-indifferent, Gram-negative bacteria, against which it exhibits its most potent action.

Sensitivity of Organisms

A modification of the broth serial dilution method was developed for determining the streptomycin sensitivity of bacteria as well as for assay of the drug in body fluids. Individual strains of susceptible organisms vary in their sensitiveness. *Pseudomonas aeruginosa* shows the highest incidence, approximately 15 per cent, of drug-fast strains.

In the presence of body fluids streptomycin loses some of its antibacterial property and in this respect it bears some resemblance to the common antiseptics. The tolerance of Gram-positive cocci to streptomycin may be increased four to eight times in the presence of body fluids. Its inhibition of Gram-negative bacteria, however, is not altered. Thus the effectiveness of streptomycin is less than that of penicillin against Gram-positive cocci.

Streptomycin is effective against penicillin-fast cocci and should be used as an agent for penicillin-fast, Gram-positive organisms when penicillin is ineffective.

In particularly resistant cases it is desirable to use both penicillin and streptomycin if the clinical and laboratory findings warrant it. Such *in vitro* tests are carried out under the conditions most favorable to the activity of the antibiotic. An environment of pH of 7.8 with low salt content is ideal. Any lowering of pH requires increased quantities of streptomycin.

Properties

Streptomycin is marketed as the hydrochloride* or the sulfate.† It is a fine yellow-orange crystalline powder and is dispensed in vials containing 0.25 gram or 0.5 gram. The drug was first standardized in terms of "S" units which bore no relationship to penicillin units. More recently it has been placed on a weight basis. One gram now contains 1,000,000 "S" units. Each milligram contains therefore 1000 units and each microgram is the equivalent of 1 unit. All dosages given in this article will be expressed in terms of grams and bacterial sensitivities and body fluid drug levels in terms of micrograms.

Absorption and Excretion

Streptomycin is absorbed and diffused in a similar manner to penicillin after injection except that the peak is slightly slower in ascent and descent. It reaches the blood stream shortly after intramuscular injection and is excreted rapidly by the kidneys. Because the excretion rate is slower than that of penicillin the drug need not be given so frequently. Intramuscular injection of 0.4 Gm. every 4 hours provides a maintenance blood serum level of 16 micrograms per c.c. Tests made on 24-hour samples of urine showed concentrations of 1000 to 4000 micrograms per c.c., dependent upon the output of urine.

DILUTION TABLE

cc. of solvent added to vial	Vial containing 1 Gm. of Streptomycin		
	Gm.	Streptomycin per cc. of solution mg.	Micrograms
20 cc.	0.05	50	50,000
10 cc.	0.10	100	100,000
5 cc.	0.20	200	200,000
4 cc.	0.25	250	250,000

Streptomycin is a light powder, considerably more so than is penicillin. It is readily soluble in water but generally insoluble in organic solvents such as alcohol, ether, chloroform and acetone. It is resistant to moderate heat and to any enzymes so far isolated. It should be stored at a temperature not in excess of 15° C. (59° F.). In aqueous solution the pH is close to neutral. All solutions of the drug should be stored in the refrigerator and for parenteral use only solutions prepared within 24 hours and preferably less should be used. They should not be subjected to autoclaving as losses as high as 60 per cent have been reported at 120° C. for 20 minutes.

By virtue of its basicity streptomycin is most effective in alkaline medium. In acid medium a greater amount is necessary.

As a result of these findings the organisms against which streptomycin may be used have been divided into two main categories: (a) sensitive organisms, those which are inhibited by 16 micrograms or less and; (b) moderately resistant, those inhibited by 16 to 32 micrograms. Any which require over 32 micrograms are considered bacteriologically and clinically resistant. This of course is significant only when the focus of infection is such that treatment is dependent upon the drug being carried by the blood.

Preparation of Solutions

For parenteral administration 1 gram of streptomycin is dissolved in sufficient physiological saline solution to make 10 cc. One cc. of procaine hydrochloride solution (1 per cent) is added to each dose to alleviate the pain at the site of injection. Application of an ice bag may also help.

*Merck and Co., Rahway, N. J.

†Abbott Laboratories, N. Chicago, Ill.; Charles Pfizer and Co., New York, N. Y.; E. R. Squibb and Sons, New York, N. Y. and others.

The following dilution chart is useful in preparing solutions of other concentrations:

Enough solution should be used so that the preparation is clear and free of undissolved particles. The site of injection should be changed each time and the total volume kept as small as possible.⁶

Administration

The intramuscular route is preferred to the intravenous since the latter possesses no advantage and the former is less likely to cause acute toxic reactions. Oral administration is limited to those diseases in which a high intra-enteric concentration is desired since very little diffuses into the blood stream and little or none appears in the urine.

The presence of streptomycin in the urine may be roughly determined by use of alkaline copper solutions (Benedict's solution). High concentrations of the drug will reduce such solutions. For this reason traces of sugar in the urine of the patient may be reported while he is receiving streptomycin. This finding is usually false and should be verified by blood sugar determinations which usually reveal a normal condition.

Streptomycin is distributed similarly to penicillin after absorption. In the treatment of infections in certain portions of the body intramuscular administration should be supplemented by direct injection. These localities include the joint cavities, pleural spaces and the cerebrospinal system. The dosage employed is 100 to 250 mg. in an appropriate amount of saline once a day.

Toxicity

The toxic properties of streptomycin are divided into four categories. The first to be considered are the effects on the central nervous system. Streptomycin has an effect on the vestibular apparatus of the eighth nerve which is manifested by ringing in the ears, dizziness and staggering on arising from bed. Occasionally there is an asymptomatic but audiogram-detectable deafness (high or low tone). This effect is the most serious and warrants

cessation of therapy. It is an elusive complication because the optic nerve rapidly assumes the function of the eighth nerve and compensates for the vestibular derangement. This toxic reaction is encountered in about 1 per cent of the cases and has not been found prior to two weeks of intensive therapy.

The second group of toxic symptoms are the so-called allergic-like reactions shown by skin and joint reactions. There are several types included in this group. A morbiliform rash may occur any time but usually appears on the fifth to eighth day of treatment. It may be accompanied by fever, eosinophilia, proteinuria and intense pruritus. Withdrawal of the drug causes a prompt disappearance of these symptoms. Reappearance in milder forms may take place on reinstitution of the drug. These allergic-like reactions are thought to be due to an impurity in the drug. The symptoms may be minimized by standard drugs such as benadryl, pyribenzamine, calcium gluconate and others. A less severe type of reaction may be localized to the site of the injection but is not sufficiently serious to warrant withdrawal of the drug.

Another reaction may involve the hands or feet and joints. There occurs a pain of the arthralgic type which is slower to disappear and is less common. In rare instances there appear a residual scaling of palms and soles and a giant urticaria.

The third group of toxic reactions are those of the kidney. These are manifested more in laboratory findings than by clinical symptoms. Kidney effects are featured by proteinuria, casts and occasional microscopic hematuria. In rare instances there is an elevated blood urea nitrogen. All of these reactions are reversible in that they disappear after the drug is stopped. Therefore they do not warrant interruption of therapy with the drug as it is presently available.

The fourth and last group of reactions are minor in character. They include those caused by histamine-like substances. Symptoms such as headache, circumoral pallor, tingling, and asymptomatic fall in blood pressure may be observed. They

are due mainly to an impurity present in the drug. The amount of this impurity is now controlled by the Food and Drug Administration. Therapy in this instance again should not be interrupted.

The overall reaction rate encountered in patients treated with streptomycin amounts to approximately 20 per cent but the majority are not clinically important.

Streptomycin is less toxic than the sulfonamides but more so than is penicillin. It does not affect the blood-forming organs and has no calculus-forming tendencies in the kidneys. It can be employed with the sulfonamides where clinical and laboratory findings indicate the need.

In contradistinction to penicillin and the sulfonamides it cannot be used orally in the treatment of systemic conditions because it is retained in the gastro-intestinal tract and excreted with the feces. On the other hand it is not inhibited by fecal components but even has potent action on susceptible bacteria as it passes along and rids the tract of these bacteria. It makes a potent and useful agent for the treatment of infections within the gastro-intestinal tract when such infections are caused by susceptible organisms.

As mentioned previously the Food and Drug Administration of the Federal Security Agency, on July 15, 1946, made effective certain specifications for streptomycin. They are as follows:

1. The minimum potency of commercial streptomycin shall represent not less than the equivalent of 300 micrograms of streptomycin base per milligram of dry powder. The potency of crystalline streptomycin base has been established at 1,000 micrograms per milligram.
2. It is sterile.
3. It is nonpyrogenic.
4. It is nontoxic.
5. Its moisture content is not more than 3 per cent.
6. It should cause no greater fall in blood pressure when injected intravenously into cats on the basis of 300 micrograms per kilogram than the equivalent of 0.1 microgram per kilogram of histamine base.
7. It contains no streptothricin.
8. It forms a substantially clear solu-

tion with a pH of 5.0-7.0 when the dry streptomycin is reconstituted with sterile distilled water in a concentration of 50,000 micrograms per cubic centimeter.

9. The expiration date of vials of streptomycin is eighteen months after the month during which the batch of streptomycin was released. (Refrigeration is required.)

Therapeutic Indications

Bacillary Dysentery

In non-protozoan bacillary dysentery streptomycin in a combination of the oral and systemic routes of administration possesses a striking effect, particularly on the acute type. Within the first 24 hours, if the drug is effective, there is a remission of fever and diarrhea. A five-day course of therapy is usually adequate. In the chronic cases the treatment is more difficult. Due to the high cost of streptomycin it is recommended that its use be limited to cases found refractory to the sulfonamides, which are also effective in these conditions. The effective dosage of streptomycin is 0.5 Gm. by mouth every 6 hours given simultaneously with approximately the same dose intramuscularly every 6 hours or smaller doses of 0.2 Gm. every 3 hours. Because the drug is tasteless and odorless any vehicle is suitable for oral ingestion.

Brucellosis

In brucellosis streptomycin is considered to be of little or no value. In the acute conditions of the disease it provides only temporary relief and in the chronic stages it is of no value. There is a temporary clearing of the blood stream which is frequently followed by remissions. In the armed services the use of streptomycin in this disease is discouraged since its specificity is doubtful.

Nonspecific Ulcerative Colitis

Streptomycin is considered of no value in nonspecific ulcerative colitis except for temporary amelioration of the symptoms for which other drugs are also available. The cost of streptomycin therefore does not justify its use in these cases.

Gonorrhea

When sulfanilamide therapy and penicillin therapy fail in the treatment of uncomplicated gonorrhea due to drug-fastness, streptomycin is indicated. In such cases it is just as effective as penicillin.

Meningitis

Streptomycin gives very dramatic results in the treatment of meningitis due to susceptible organisms. As with penicillin it is necessary to supplement the parenteral administration with direct injections into the cerebrospinal system.

In meningitis infections caused by influenza bacilli and other susceptible Gram-negative organisms streptomycin is certainly indicated.

Bacteremias

Bacteremia due to organisms affected by streptomycin likewise is markedly influenced with the exception of that bacteremia due to brucellosis or typhoid. In bacteremias it is necessary, as with any drug, to respect surgical principles where indicated. Pus must be evacuated, abscesses drained and foci eradicated wherever possible.

Typhoid

The results of therapy of typhoid with streptomycin have been very disappointing at Halloran General Hospital. A favorable effect with this drug is not expected in the usual run of mild cases. In certain cases favorable effects have been attributed to streptomycin.

Tularemia

Streptomycin is the best available drug for tularemia in that the experiments to date show consistently good effects in contradistinction to results with Foshay's antitularensis serum and other older types of treatment.

Urinary Infections

It has been postulated that streptomycin is a very valuable addition to the therapeutic armamentarium for infections of the urinary tract. This was definitely shown in 40 cases of urinary tract infections treated with streptomycin at Hal-

loran General Hospital.¹ The use of this drug in these conditions necessitates a triad of requirements which must be met for success:

1. The organism causing the infection must be susceptible.
2. There must be a free and unobstructed flow of urine.
3. The dosage must be adequate and kidney function must be good.

If these conditions are met streptomycin is the only agent available that has consistently eliminated *Proteus*, *Pseudomonas pyocyanea* and *Streptococcus faecalis* from urine.

Its most important action is demonstrated against the Gram-negative organisms including *E. coli*, *P. vulgaris*, *A. aerogenes*, *K. pneumoniae*, *Ps. aeruginosa*, and others. Some strains in each of these groups may not be susceptible to streptomycin. Streptomycin is particularly effective against the nonhemolytic streptococcus, a Gram-positive coccus. All portions of the genito-urinary tract can be sterilized of these organisms except for the prostate. Streptomycin administration has shown no value in prostatitis because it is not followed by an accumulation of clinically significant levels of the drug in the prostatic secretions.

Alkalinization of the urine prior to therapy was once considered as an aid since streptomycin shows greater activity in alkaline media.⁷ This is sometimes a disadvantage, as for example in conditions where *B. proteus*, an urea-splitting organism, is present. Bacterial growth is rapidly increased and there is an increased tendency to calcium phosphate precipitation. In orthopedic cases and paraplegias this is particularly significant since the tendency to form calculi of recumbency is already great. Calculus formation tendencies are also of importance when the fluid intake is restricted so as to increase the level of streptomycin in the urine. It is possible to achieve urinary levels of 500 to 2,000 micrograms per cc. by restriction of fluid intake to 2,500 cc. daily and administration of 0.4 Gm. of streptomycin intramuscularly every four

hours. Without complicating factors it is possible to sterilize the urine in most cases where the bacteria present are susceptible.

Local use of streptomycin seems to be promising in infections of the external and middle ear where the contact with the infection is good; the organism is susceptible; and drainage is adequate.

Pneumonias and Tuberculosis

Streptomycin is indicated for pneumonias due to proven susceptible organisms, although there are not sufficient clinical data to warrant a very definite statement at present.

The treatment of tuberculosis with this drug falls into the same category since this disease is characterized by clinical remissions. Longer study is necessary to learn the true effects. For the present it can be stated that ordinary pulmonary tuberculosis is still an sanatorium problem.

Peritonitis

Although the over-all results of the use of streptomycin in peritonitis following appendicitis and perforated intestines are favorable, they are not striking. Here, too, more information is needed to proper-

ly assess the use of streptomycin with surgery in peritonitis.

Pertussis and Ozena

Early experiments with streptomycin in whooping cough and ozena have shown promise but results are still incomplete.

Wound Surfaces

Lastly, some good results have been obtained from topical applications of streptomycin to wound surfaces in which susceptible bacteria are present. The over-all results are not so striking as with penicillin when the latter is used against penicillin-susceptible organisms.

Experience with streptomycin has given evidence that the most favorable results may be expected when the susceptibility of the invading organism to the drug is first determined quantitatively by *in vitro* tests and when the initial dosage is given and maintained at this or greater levels. This eliminates the great hazard of producing drug-fastness in the organisms which when developed makes the use of streptomycin entirely ineffective. The tolerance that can be developed toward streptomycin by some organisms by inadequate dosage is almost unbelievable and in some cases the new dosage required is beyond the realm of possibility unless toxic effects in the patient are to be produced.

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Army Medical Library Consultants Press Plans for New Building

AT recent meetings in Washington, the Association of Honorary Consultants to the Army Medical Library urged early action for a new library building. Major General Norman T. Kirk, The

Surgeon General of the Army, says that it is planned to ask Congress at the next session for enabling legislation to build the library and that it is hoped to include the request for funds in the 1948 budget. The 110 year old Library is now housed in a non-fireproof structure which was built in 1887.

MISCELLANY

WILLIAM HENRY PERKIN, THE BOY CHEMIST

IT was an English boy, William Henry Perkin, who discovered the aniline dyes (1856) and started the Germans on their vast development of the coal-tar products which have so greatly influenced modern medicine.

This marvelous schoolboy actually became a creative chemist at the age of eighteen. Home for the Easter holidays, he amused himself by experimenting with material which had resulted from an attempt, in the midst of a malaria epidemic, to make quinine artificially.

Strecker, in 1855, had ascertained the constituents of the quinine molecule (24 hydrogen atoms, 20 carbon atoms, 2 oxygen atoms and 2 nitrogen atoms). Perkin was the first to attempt synthesis. The effort to produce quinine was bound to fail in 1856, but out of it came mauve, first of the coal-tar dyes whose elaboration was to create a vast chemical industry.

Parenthetically, it was only the other day that the Americans Woodward and Doering succeeded in the task initiated by Perkin (announcement to that effect made May 7, 1944) and there is some reason to hope that its commercial development will not lag.

Thus from a discarded tar barrel Perkin evolved the first dye, after which he built the machinery needed for large-scale production and created the needed chemicals from crude materials as nitric and sulfuric acids were not readily available. For nitrate he had to send to Chili.

The present world of colors has to a

large extent come out of Perkin's tar barrel—as well as the perfumes and many of the drugs of today.

He was born the youngest of three sons on March 2, 1838. His father was a builder and contractor. At five he was painting and doing carpentry work but real inspiration came when he saw crystals

formed by a school friend in the course of chemical experiments. It was much like the awakening of that other marvelous boy, Chatterton, by the illuminated letters from old manuscripts found in the ancient Bristol church of which his father was sexton, upon which experience was founded his study of old English and his creation of beautiful poems and fascinating literary forms.

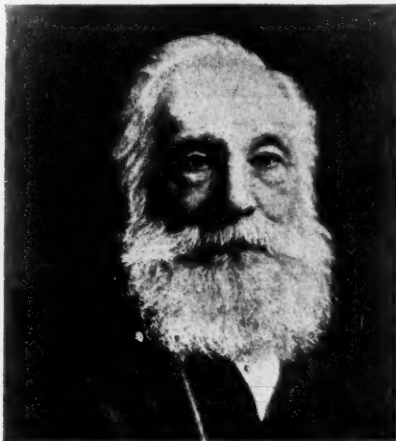
At thirteen Perkin was an amateur chemist of parts. At fifteen he entered the London School of Chemistry, where he became assistant to the director. But he was interested only in the unknown. At eighteen we find him addressing the Chemical Society of London on his original work.

The English seem to have lagged in the recognition and utilization of his products, just as they lagged later in the manufacture of steel. But the Continent reached out for his dyes and his self-built factory buzzed.

When Perkin was twenty-three, Faraday, an early teacher of his, listened to the lectures of his erstwhile pupil before the Chemical Society of London.

There was not much patent protection

—Concluded on page 349



CONTEMPORARY PROGRESS

MEDICINE

Hypochromic Anemia: Treatment with Molybdenum-Iron Complex

J. C. HEALY (*Journal-Lancet*, 66:218, July 1946) reports the use of a molybdenum-iron complex (M-I complex) in 49 cases of moderately severe hypochromic anemia, with a control series of 21 cases treated with ferrous sulfate. The molybdenum-iron complex employed is prepared by co-precipitation of molybdenum sesquioxide and ferrous sulfate to form a homogeneous mass with a partial physical union of the two salts. It was administered in the form of tablets, each containing approximately 40 mg. of ferrous iron; these tablets were given in divided daily doses to give a total daily dosage of approximately 230 mg. of elemental iron. In the cases treated with ferrous sulfate tablets, the daily dosage was approximately 380 mg. The severity of the anemia in the two groups was comparable. In the group treated with the M-I complex, the hemoglobin level rose to normal in all cases in nine to thirty-one days, average 13.7 days; the average daily increase in hemoglobin was 0.36 gm. per cent. In the group treated with ferrous sulfate, the patients were under observation for fifteen to twenty-four days, average 20.7 days, and in this time only 2 patients showed a rise in hemoglobin to 12 gm. per cent, considered to be a low normal value; none of the other patients in this group showed normal hemoglobin values. The average daily increase in hemoglobin was 0.12 gm. per cent, significantly less than the average daily increase with M-I complex. It is important that an iron preparation employed in the treatment of hypochromic anemia should be well tolerated. Of the 49 patients treated with M-I complex only one complained of any gastro-intestinal distress—mild abdominal cramps—which were entirely relieved when the dosage was reduced. Of the 21 patients given ferrous sulfate, 6

complained of gastro-intestinal symptoms, which were severe enough to necessitate discontinuance of the treatment in one case, but were relieved in the other 5 cases by decreasing the dose. Using the method described by Fullerton to determine the percentage of orally administered iron utilized in the formation of hemoglobin, it was found that with the M-I complex from 9 to 50 per cent was utilized, while with ferrous sulfate the utilization rate did not rise above 10.8 per cent. These findings indicate that the molybdenate-iron complex used in these cases is "unusually effective" in the treatment of hypochromic anemia and also a well-tolerated iron preparation.

COMMENT

An interesting development, especially since some persons find that ferrous sulfate tablets cause gastric distress.

M.W.T.

The Use of the Newer Sulfonamides and Antibiotics in Intestinal Diseases

J. A. BARGEN (*Medical Clinics of North America*, Mayo Clinic No. 919, July 1946) reports the use of some of the newer sulfonamides in the treatment of various intestinal infections. Penicillin has also been employed in streptococcal ulcerative colitis, but otherwise the antibiotics have not been much used in intestinal infections, although it is probable that streptomycin will also prove to be of value in some of them. In streptococcal ulcerative colitis, azosulfamide (prontosil) was found to be effective, but because toxic reactions occurred with this drug which involved destruction of the cellular elements of the blood, other sulfa drugs have been more frequently used. Phthalylsulfathiazole and carboxythiazole (sulfacarizole) have been found to be of very low toxicity and effective in the treatment of streptococcal ulcerative colitis. Both of these drugs

are given in doses of 3 gm. daily, in divided doses. The administration of several of the sulfonamide drugs may give better results in some cases of ulcerative colitis of this type, than any one drug alone. Any of these drugs are given for two weeks, then stopped for a week, and given again. The best results are obtained in the more acute cases in which the intestine has not become contracted and deformed. In ulcerative colitis due to the virus of venereal lymphogranuloma, various sulfonamide drugs, including sulfanilamide, sulfathiazole and sulfaguanidine, have given good results; with sulfanilamide, the drug has been given by rectum (retention enemas) as well as by mouth. In regional ulcerative colitis, involving isolated segments of the large intestine, succinyl sulfathiazole has proved the most effective drug in a dosage of 10 to 12 gm. daily in five divided doses. In some cases when the changes in the intestinal wall are well advanced, surgery is indicated; in such cases succinylsulfathiazole is given preoperatively. Regional ileitis is treated in the same way, with succinylsulfathiazole the drug of choice. In the treatment of bacillary dysentery, sulfaguanidine in large dose has given the best results, in the author's experience. The sulfonamides are also of value in an acute attack of diverticulitis, but surgery may nevertheless be indicated when the acute symptoms have subsided. Penicillin, given by intramuscular injection, has given good results in the treatment of the acute fulmi-

nating form of streptococcal ulcerative colitis; the preliminary results were "not encouraging." But streptomycin may find a place in the treatment of other forms of colitis.

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COMMENT

Succinyl sulfathiazole and phthalylsulfathiazole have been valuable additions to our armamentarium, especially for ulcerative colitis, abdominal surgery, amebiasis, giardiasis and paratyphoid infections.

M.W.T.

Some Effects of the Rice Diet Treatment of Kidney Disease and Hypertension

WALTER KEMPNER

(*Bulletin of The New York Academy of Medicine*, 22:358, July 1946) reports the results of the rice diet in cases of renal disease and hypertensive vascular disease. The rice-fruit-sugar diet employed contains 2000 calories, with about 5 gm. of fat and 20 gm. of protein derived from the rice and fruit, with not more than 0.2 gm. of chloride and 0.15 gm. of sodium. This has been called a starvation diet, but determinations of the daily urinary nitrogen excretion of patients who have followed the rice diet for two months show that nitrogen equilibrium is maintained. The blood urea nitrogen is below the normal, and the hemoglobin and plasma protein levels are maintained. With the rigid restriction of fat in the diet, hypercholesterolemia, which is frequently found in hypertensive vascular disease, decreases. With the restriction of sodium and chloride in the diet, the urinary excretion of these substances decreases. Definite im-

provement was obtained in 205 of 322 patients with primary kidney disease or hypertensive vascular disease. Of 100 patients with primary kidney disease, 65 per cent showed definite improvement; and of 222 with hypertensive vascular disease, 62 per cent were definitely improved. In 100 patients with hypertensive vascular disease who followed the rice diet for two months or longer, electrocardiograms showed inversion of T 1 waves in 31 patients before treatment; in 11 of these 31 the T waves became normally upright in an average time of six months. The heart was enlarged in 87 patients, and in 77 of these became smaller. In 44 patients in whom papilledema, or retinal hemorrhage or exudates had been found, the retinopathy was arrested in all cases; in 20, the papilledema, hemorrhages or exudates cleared up completely and in 20 partially.

COMMENT

These reports on the use of the rice diet are interesting. A diet containing 2,000 calories a day is not a starvation diet. Kempner found that on a prolonged rice diet nitrogen equilibrium is maintained. No doubt some patients are weak on such a diet. On the other hand many of them are clinically improved and no doubt some complications are prevented.

M.W.T.

The Tonic Effects of Insulin in Acute Alcoholism

E. G. VASSAF and V. R. HALL (*New England Journal of Medicine*, 235:190, Aug. 8, 1946) report the use of insulin in small doses in the treatment of 43 patients admitted with acute alcoholism. This was combined with the usual method of treatment of acute alcoholism by gradual withdrawal of alcohol, a high-caloric, high-vitamin diet, sedatives, some form of

antacid, physiotherapy, and psychotherapy. The diet included large amounts of fluid, especially fruit juices; vitamin B₁ supplements were given to patients showing signs of vitamin B₁ deficiency or giving a history of grossly inadequate diet. The controls in this series were treated by these methods without insulin. The 43 insulin-treated patients were given 10 units of insulin subcutaneously twenty minutes before meals two or three times daily; their milk and fruit juice interfeedings were supplemented with 4 gm. of cane sugar. The patients receiving insulin required alcohol for slightly less than half the time than the controls; 44 per cent of the insulin-treated patients required no alcohol after admission, as compared with 14 per cent of the controls. The insulin-treated patients were in better general condition and suffered less discomfort during the withdrawal period than the controls; the amount of sedation required was greatly reduced in all cases; and in some cases no sedatives were necessary; the gain in weight was greater and more rapid. There were only 3 cases of insulin reaction, all of which were mild and promptly controlled by the administration of 20 gm. can sugar in orange juice. Intravenous administration of glucose was not required in any case. On the basis of these results the authors conclude that the use of insulin in small doses "deserves serious consideration" in the treatment of acute alcoholism.

COMMENT

The authors have outlined an effective plan to treat persons with acute alcoholism. The use of insulin would require hospitalization, which all of these patients should have. However, it is not easy to find a hospital which will admit such patients.

NEUROLOGY

Cerebral Vascular Occlusion in Young Adults

I. S. ROSS (*Journal of Nervous and Mental Disease*, 104:51, July 1946) reports 6 cases of cerebral vascular occlusion with resulting cerebral damage and perma-

nent sequelae, occurring in adults twenty-five to forty-two years of age. In 2 cases a diagnosis of superficial sylvian softening of posterior type was made on the basis of the neurologic signs and symptoms; in 1 case each, the diagnosis was occlusion of

rolandic artery; partial softening of posterior sylvian artery, parieto-angular region; softening of deep sylvian branches; and occlusion of one of the interpeduncular branches of the posterior cerebral artery. None of these patients had syphilis, hypertension or any known blood dyscrasia. Such attacks of cerebral vascular occlusion in adults below the age of 50 years are rarely fatal, and there were no deaths in the series. At Bellevue Hospital it was impossible to find any autopsy report where death was due to cerebral vascular occlusion in a person below the age of 55 years without hypertension, syphilis or embolism. In the absence of pathological studies, no conclusion can be drawn as to the type of lesion present in these cases. The possibility of vascular spasm may be considered as the cause of such cerebral vascular occlusion, but none of the author's patients showed any evidence of vasomotor instability. On the other hand Ford of Johns Hopkins Hospital has reported a case of cerebral vascular thrombosis in a child four years of age, in which it was found that the thrombosis occurred at the site of a ruptured intimal atheromatous plaque and that the cerebral arteries all showed such intimal plaques. The author, therefore, considers it probable that localized atherosclerosis in the cerebral arteries, such as might be found in coronary occlusion in relatively young persons, is the underlying pathological lesion in cases of cerebral vascular occlusion in adults of the younger age groups.

COMMENT

S. A. K. Wilson pertinently states that in a given case the precise character of the morbid process cannot always be decided. In the experience of the reviewer in the cases presented, disease of the blood vessel or its contents must be postulated. In similar cases where the etiology has not been obvious, and postmortem examination has been obtained, isolated patches of arteriosclerosis have been found.

In reference to the contents of the vessel, Von Hosslin and also Moxon have described paraplegia of spinal origin and cerebral vascular disease, occurring in pregnant women. The reviewer can confirm the occurrence in pregnant women, in whom no detectable cause could be found.

It is regrettable that in the author's series no postmortem examinations were obtained.
H.R.M.

Prognosis in So-Called Sciatic Neuritis

H. S. DUNNING (*Archives of Neurology and Psychiatry*, 55:573, June 1946) reports a follow-up study of 55 cases of sciatic neuritis. The majority of cases of this type are now recognized as being due to herniation of the fourth or fifth intervertebral disk, but none of the patients in the series reported had a spinal operation. The period of the follow-up in these cases ranged from one year and three months to twenty-three years after the first attack in which a reliable diagnosis of sciatic neuritis was made. Of the 55 patients, 20 are entirely free from pain, and 10 reported slight pain in the lower back or leg, not causing any disability; thus 54 per cent reported a satisfactory result. The remaining 25 patients had severe pain in the lower back or leg, chiefly the latter, which in 7 cases was disabling. Comparing the incidence of certain neurological signs and spinal fluid findings in these cases at the time that the diagnosis was made with the results, it was found that the incidence of impairment of the ankle jerk was the same in the group with satisfactory results and in the group with unsatisfactory results; decreased sensation and weakness were more frequent in the group with satisfactory results; the total protein content of the spinal fluid was essentially the same in both groups, being above the normal level in approximately half of each group. The average age at the time of the first attack was higher in the group with satisfactory results (45 years) than in the group with unsatisfactory results (38 years). In comparison, results in a group of 82 patients in which a spinal operation, usually removal of herniated nucleus pulposus, was done for sciatic neuritis at New York Hospital are presented; the follow-up in these cases was for six months or longer. Of the 82 patients, 60 per cent are entirely free from pain and 26 per cent have only slight pain, giving 86 per cent satisfactory results as compared with 54 per cent in the author's series in which no spinal operation was done. Yet, since the results were

satisfactory in so large a percentage of cases without operation, the author is of the opinion that in most cases of sciatic neuritis, "natural processes should be given an opportunity to repair the defect" before a spinal operation is done. The neurologic signs and the protein content of the spinal fluid at the time of the attack are not of prognostic value.

COMMENT

There is no doubt that the symptoms in many cases of disc syndromes may subside spontaneously, for often a story of recurring sciatic pain is elicited, and when elicited is a confirmatory diagnostic historical aid.

There exists an inherent danger in delaying operation once a diagnosis seems established, for a vicious extrusion may produce a paraplegia and sphincteric paralysis. One who has had experience with such cases is loath to advocate delay.

Use of Curare in Oil in Treatment of Spasticity Following Injury of the Spinal Cord

E. S. SCHLESINGER (*Archives of Neurology and Psychiatry*, 55:530, May 1946) reports 11 cases with extreme spasticity resulting from injury to the spinal cord, in which curare was used for relief of the spasticity. In 9 of the 11 patients there was complete paraplegia, while in 2 instances demonstrable voluntary function was masked by the spasticity. When curare was given by intramuscular injection in aqueous solution, excellent relaxation was obtained, but at the peak of the action of the drug, blurred vision, diplopia, general weakness and dizziness occurred, which interfered with the patient's usual educational and social activities. While the therapeutic effect of curare reached its peak rapidly, some effect was noted in several cases up to eighteen hours. The side reactions also subsided rapidly. Subsequently a suspension of *d*-tubocurarine chloride in peanut oil-white wax mixture was used in the treatment of these cases to give a slow-acting curare effect. Definite relief of the spasticity was obtained in these cases for much longer periods than with the aqueous solution of curare; the therapeutic effect was evident in some cases for as long as three days. The effect was more marked

in the paretic than in the paraplegic patients. None of the undesirable effects of curare were observed in these cases, and the patients were able to carry on their usual activities. Four of the cases are reported; the dosage in these cases varied from 1 to 1.5 cc.

COMMENT

An interesting approach to an old problem. As the author suggests, much more investigation needs to be done before proper evaluation of this treatment can be made, particularly as to whether the continuous use of this drug over long periods of time may possess side effects not to be ignored.

H.R.M.

Sensation of Electric Shock Following Head Injury

NORMAN REIDER (*Archives of Neurology and Psychiatry*, 56:30, July 1946) reports 30 cases of head injury in soldiers in which a sensation of electric shock was produced by flexion of the neck; this momentary sensation started in the neck and passed down the arms, spine and legs. This phenomenon was usually bilateral, but in some cases involved only one side of the body. In most of the cases the sensation of electric shock always followed flexion of the neck, but in a few instances it occurred only occasionally on flexion. Of the 30 patients in this series, 25 had comminuted fractures with resultant defects in the skull; 3 had only simple linear fractures; and 2 showed no evidence of skull fracture; 20 of the fractures occurred on the left side. The time of the appearance of the electric shock phenomenon varied from a few days to six months after the head injury; the average period was nine weeks. In most of the cases this symptom has entirely disappeared in an average period of a little over three months; in a few patients it still persists at the time of this report. This symptom of sensation of electric shock on flexion of the neck following head injuries was first observed and described in World War I. It has also been observed in multiple sclerosis. This phenomenon in head injuries has been attributed to concomitant concussion of the cord; in many of the

author's cases the severity and type of the injury were such that damage to the cord would probably have occurred. In other cases the conditions suggest a cerebral factor as the cause. No correlation of the symptom with the site of the lesion, the duration of unconsciousness or the nature of the surgical intervention could be demonstrated.

COMMENT

The syndrome of Lhermitte is well known to all neurologists. As stated by the author of the paper it is fairly common in conditions involving the spinal cord, and is always searched for in taking a history. It is significant that it always indicates organic disease and in this respect the reviewer has never noticed this complaint except in organic disease.

The precise mechanism of its production still requires explanation.

H.R.M.

Craniotomy and Total Dissection as a Method in the Treatment of Abscess of the Brain

E. F. FINCHER (*Annals of Surgery*, 123:789, May 1946) reports 5 cases of abscess of the brain treated by craniotomy and removal of the abscess *in toto*. All these patients made a good recovery. The method of operation now employed by the author in brain abscess is to expose

the dome of the abscess through the craniotomy, and then wall off the surrounding brain tissue with cottonoid strips soaked in penicillin. An area of 3 mm. on the dome of the abscess is coagulated with the electrocoagulating current, and a ventricular needle introduced into the abscess for complete aspiration of its contents. Penicillin is injected into the cavity after aspiration before the needle is withdrawn. The opening is closed by grasping the abscess capsule with closed tissue forceps, and this hold is maintained, if possible, during dissection, forcing the white matter away from the abscess wall until the sac (or its remnants) is brought to the surface. Gelatin sponge strips soaked in thrombin and then in penicillin are placed in the cavity and the dura closed by suture. The craniotomy is closed without drainage.

COMMENT

If this technical procedure can be accomplished without too great damage to the brain and with survival of the patient, it should be a logical answer to the problem of brain abscess. Offhand, it seems that the long period of hospitalization, often associated with brain abscess, should be immediately lessened. The removal in toto of the offending mass should be promptly perceptible in the responses of the patient.



WILLIAM OSGOOD PERKIN

—Concluded from page 343

in those days (is there now?) and Perkin did not profit from his genius to anything like the extent he should have.

Then the Germans took over Perkin's tar barrel and some of his magic and by 1869 were well on their way to supremacy. Indeed, Perkin went along with them creatively, sharing such discoveries as the commercial production of indigo and participating modestly in the foreign profits. The English seem not to have been ready to devote sufficient capital to the enterprise and Perkin wished to get out of

the competitive atmosphere and study new things, like his new mown hay perfume (coumarin), the first of that new creative series. And he was absorbed in the new physics (in fact laid the foundation for magnetic rotary polarization).

In due course of time—1906—Perkin was dubbed Sir Knight, so he usually appears in the records as Sir William.

Our civilization and culture hark back to Perkin. He initiated very much of what characterizes the world of the present—dyes, perfumes, antiseptics, anesthetics, analgesics, spirocheticides, gases, fertilizers, explosives, in short, creative chemistry.

What a boy!

Medical BOOK NEWS



JOHANNES WEYER
1515-1588

Classical Quotations

• Although I answered fully to this [various arguments in favor of the traditional belief in witchcraft] in the Third Book, chapters three and four, I should like to add a few more words, and first of all ask, how do you know that they [the witches] have made a pact with the devil? You will agree with me that you were not present at the conclusion of this pact and that you never heard anyone worth believing who had witnessed it himself. This knowledge, then, is acquired solely through the confusion of these poor old stupid and troubled women, and the confusion is either voluntary or given under stress. If it is the latter, then it is imperfect and of no value, because it was exacted under the unbearable pains of torture; is there anything more dangerous than to depend, in such complicated matters, with no eyewitnesses to be found, solely on the confession of an old woman who has lost her mind? Johann Weyer
De praestigiis daemonum, et incantationibus, ac veneficiis, Libri V. 1563.

What the Hair Is

Your Hair and Its Care By Oscar L. Levin, M.D. & Howard T. Behrman, M.D. New York. Emerson Books, [c. 1945]. 12mo. 184 pages, illustrated. Cloth, \$2.00.

THIS is a small book written for the layman to tell him what the hair is, how it may be maintained in a healthy state, and how it is affected by disease and age.

The care of the scalp under normal conditions is adequately outlined, including advice as to the frequency of washing, the detergents to be used, the value of massage, the type of comb and brush that is most desirable and the care of these instruments. It includes information on the effects of curling, dyeing, singeing, etc.

Diseases of the scalp and hair developing

Edited by
ALFRED E. SHIPLEY, M.D., Dr. P.H.

All books for review and communications concerning Book News should be addressed to the Editor of this department, 1313 Bedford Avenue, Brooklyn 16, N. Y.

from a constitutional disturbance, are outlined, as are also those of purely local origins, such as ringworm. In all instances the information given is such as to enable the reader to intelligently cooperate with the physician in the care of his scalp.

Chapters appear on the various types of baldness, the relationship of the endocrine glands to scalp diseases and some pertinent facts on vitamins. In these latter, the authors have told simply what is known but do not give the impression that administration of endocrines or vitamins, is a sure cure for all their fallen or diseased hairs.

The book closes with a number of the common questions patients ask about their hair, and gives short, straightforward answers which dispel many fears and explode many superstitions.

It is a book you can safely recommend to your patients, knowing that after they have read it they will not feel they can supersede their physician, but can more intelligently work with him, and understand what he is trying to do in their behalf.

E. ALMORE GAUVAIN

Handicapped Children

Introduction to Exceptional Children. By Harry J. Baker, Ph.D. New York, The Macmillan Co., [c. 1944]. 8vo. 496 pages, illustrated. Cloth, \$3.50.

THIS book is intended primarily for use as an introductory course for college and university students. Its topics include the physically handicapped, mental growth and development, neurological and psychogenic diseases, behavior adjustments and educational retardation.

It may be recommended by physicians for the use of parents of exceptional children.

STANLEY S. LAMM

Surgical Pathology

Pathology in Surgery. By Nathan Chandler Foot. Philadelphia, J. B. Lippincott Co., [c. 1945]. 4to. 511 pages, illustrated. Cloth, \$10.00.

THIS text book of 511 pages on Surgical pathology is essentially an expansion of the subject matter of the Third Year course in surgical pathology as it has been taught by the author during the past twelve years in the Cornell University Medical College.

It is divided into four categories (A) Trauma (B) Developmental anomalies (C) Inflammatory lesions (D) Tumors.

The subject matter covers a great many problems the surgeon and surgical pathologist encounter in the operating room and laboratory. The description of this material with illustrations, in places leaves a great deal to be desired, of necessity at times sketchy due to lack of space. The author does quite a good job in this text on surgical pathology which is so important to the background of every surgeon. One does not hesitate to recommend this book to surgeons.

GAETANO DE YOANNA

Amebic Disease

The Etiology, Diagnosis, and Treatment of Amebiasis. By Col. Charles Franklin Craig, U.S.A., Ret., D.S.M. Baltimore, The Williams & Wilkins Co., [c. 1944]. 332 pages, illustrated. 8vo. Cloth, \$4.50.

COLONEL CRAIG, as a teacher, author and investigator in the field of tropical medicine, is eminently qualified to produce a work on endamebiasis histolytica. In view of the tropical distribution of much of our military forces, the increasing importance of amebiasis is obvious.

Throughout the book discussion of pathology, symptoms, diagnosis and treatment is arranged according to the author's classification of the disease into: I. "healthy" carriers, II. "symptomatic" carriers, III. recurrent enteritis, IV. acute and chronic dysentery, V. complications.

There is an extensive section on laboratory diagnosis, including technique and formulæ of culture methods. The microscopic examination of the feces is fully discussed and illustrated. Although labora-

tory diagnosis requires experience, the techniques are well and fully described. The pharmacology and administration of the therapeutic drugs are fully discussed. The author explains why he prefers emetine only for the control of severe diarrhea, and not as a curative. The oxyquinolines are his treatment of choice.

MILTON WALD

Applied Biochemistry

Human Biochemistry. By Israel S. Kleiner, Ph.D. St. Louis, C. V. Mosby Co., [c. 1945]. 8vo. 573 pages, illustrated. Cloth, \$6.00.

THE author has written a very comprehensive volume. He has included not only a satisfactory presentation of biochemistry, but has also devoted a large part of the book to the physiology of metabolism, nutrition, and many clinical aspects of diseases of metabolism. This makes it a very practical book which should prove of value both to the medical student and the general practitioner. The author is a leading biochemist, who has made important contributions to our knowledge of carbohydrate metabolism. The book is authoritative, is very well written and reads easily. It is highly recommended.

WILLIAM S. COLLENS

Otolaryngology

Diseases of the Nose, Throat, and Ear. Including Bronchoscopy and Esophagoscopy. Edited by Chevalier Jackson, M.D. & Chevalier L. Jackson, M.D. With the collaboration of 64 outstanding authorities. Philadelphia, W. B. Saunders Co., [c. 1945]. 4to. 844 pages, illustrated. Cloth, \$10.00.

TWO of the foremost men in their field edit this modern text and reference in otolaryngology and allied sciences, which represents the work of sixty-four leading authorities. Each phase of this intricate field is dealt with not only by a specialist in the whole field but by an outstanding specialist in the particular phase concerning which he is author. Each part is a summation of a particularly qualified author's knowledge and experience backed by imposing bibliography covering this literature to date. This is by far the best general book in otolaryngology and allied science and practice yet produced.

CHAS. R. WEETH

The Story of Anesthesia

Man Against Pain. The Epic of Anesthesia. By Howard Riley Raper. New York, Prentice-Hall, [c. 1945]. 8vo. 337 pages, illustrated. Cloth, \$3.50.

THE author tells the story of anesthesia in a popular style that does not interfere with its scientific accuracy. It is written by a layman for an unprofessional public audience; this makes the style lighter and gives touches of humor to add to the human interest.

The ancient attempts to achieve relief of pain, especially in relation to surgical procedures are covered about as fully as in a medical textbook. When he comes to the birth of modern anesthesia his account gives a detailed round by round narrative of the fight between Wells and Morton and gas versus ether. He has searched the records carefully, has all the authenticated facts at hand and yet sticks mainly to the role of reporter without attempting to be too much the partisan.

And in the later chapters, discussing the modern anesthetic agents, he adopts the same judicial attitude in simply stating the new additions and improvements without being an advocate of any new drug or method. For modern anesthesia the author has given a very fine explanation to the public.

G. W. TONG

Limb Fitting

Amputation Prosthesis. Anatomic and Physiologic Considerations, with Principles of Alignment and Fitting Designed for the Surgeon and Limb Manufacturer. By Atha Thomas, M.D. & Chester C. Haddan. Philadelphia, J. B. Lippincott Co., [c. 1945]. 8vo. 305 pages, illustrated. Cloth, \$8.00.

THIS small concise book on amputation prosthesis is well written and informative. The text is illustrated with well selected photographs and diagrams.

There is much information for the surgeon on basic principles of amputation and fitting of prostheses. The idea of fitting the prosthesis to the individual is stressed throughout—never fit the patient to the prosthesis.

The most interesting book the reviewer has read on this subject.

OTHO C. HUDSON

Science in the Dutch East Indies

Science and Scientists in the Netherlands Indies. Edited by Pieter Honig & Frans Verdoorn. New York, Board for the Netherlands Indies, Surinam & Curacao, [1945]. 4to. 491 pages, illustrated. Cloth, \$4.00.

THIS fairly large volume presents the development and status of the natural sciences, pure and applied, in the Netherlands Indies.

The work consists of many articles by various scientific authors such as original articles, reprints bearing on natural science, travel accounts of life and nature, notes, biographical sketches, reviews, and a list of scientific institutions, societies and workers, in the Netherlands Indies.

Those articles of most interest to the medical scientist are:—

1. A Short History of Beri-Beri Investigations. By David G. Fairchild, Ph.D., Sc.D., which is of great interest especially to the student in vitamin deficiencies.

2. Missionary Physicians and Hospitals. By K. P. Groot, M.D.

3. The Introduction of Chinchona into Java. By K. W. van Gorkum, which deals with the romance of the cultivation and pharmacy of this essential drug.

4. Modern Developments in the Production of Cinchona.

5. Rabies Research in the Netherland Indies. By M. J. Otten-van Stockum, M.D. which deals with results of anti-rabic treatment with live and formalized monkey fixed virus in the light of a new method of analysis of rabies statistics. This is of interest to our Pasteur students and etilogists.

6. Medical Contributions from the Netherlands Indies. By T. Snapper, M.D. in which the author describes contributions on various tropical diseases which are of extreme interest to the traveler in the South Seas.

7. Medical Education in the Netherlands Indies. By A. de Waart, M.D., illustrates that the mother country has not been negligent in teaching her sons and natives to become highly skilled physicians.

Some articles in the book are in French and some in Dutch but the above are all in English and make most interesting and educational reading. THOMAS B. WOOD

BOOKS RECEIVED for review are promptly acknowledged in this column; we assume no other obligation in return for the courtesy of those sending us the same. In most cases, review notices will be promptly published shortly after acknowledgment of receipt has been made in this column.

Western Reserve University Centennial History of the School of Medicine. By Frederick Clayton Waite, Ph.D. Cleveland, Western Reserve University Press, [c. 1946]. 8vo. 588 pages, illustrated. Cloth, \$6.00.

Electrocardiography. Including An Atlas of Electrocardiograms. By Louis N. Katz, M.D. 2nd Edition. Philadelphia, Lea & Febiger, [c. 1946]. 4 to 883 pages, illustrated. Cloth, \$12.00.

Exercises in Electrocardiographic Interpretation. By Louis N. Katz, M.D. 2nd Edition. Philadelphia, Lea & Febiger, [c. 1946]. 4to. 288 pages, illustrated. Cloth, \$6.00.

Psychological Medicine. A Short Introduction To Psychiatry. With an appendix on PSYCHIATRY ASSOCIATED WITH WAR CONDITIONS. By Desmond Curran, M.B., Eng., & Eric Guttman, M.D. 2nd Edition. Baltimore, Williams & Wilkins Co., [c. 1945]. 8vo. 246 pages, illustrated. Cloth, \$5.50.

Synopsis of Obstetrics and Gynecology. By Aleck W. Bourne, M.D. 9th Edition. Baltimore, Williams & Wilkins Co., [c. 1945]. 12mo. 500 pages, illustrated. Cloth, \$5.00.

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INFLUENZA AND ENCEPHALITIS —Concluded from page 328

the Japanese B encephalitis which is a more serious and fatal malady than the forms of the disease they already have. The appropriate mosquito vectors for the Japanese B virus are well distributed in North America. Here, if needed, is a further argument for strengthening the precautions against accidental carrying of insects in aircraft.

Happily, man does not carry these viruses—or not for long—in his blood, so that it is likely that exclusion of mosquitoes will exclude the disease. What is badly needed for our peace of mind is more knowledge of the ecology of these viruses. Equine encephalitis was first recognized as a disease of horses, later found to cause encephalitis in man, and then was recovered from infected birds, especially domestic fowls, and wild-caught mosquitoes. It now seems likely that the infection is kept going during the summer in a bird-mosquito-bird cycle, men and horses being only accidentally infected and not serving to propagate the infection. But the natural history of the disease is not yet made plain (7).

We know how the viruses may keep going in the summer but do not under-

stand how they survive the winter. They have not been found to survive in overwintered mosquitoes nor to be transmitted through the egg to a second generation, nor to persist long in any vertebrates. Recovery of virus from chicken-mites (*Dermanyssus gallinae*) has not yet brought conviction that that species can act as an around-the-year reservoir of infection. One suspects that yet other arthropods or vertebrates remain to be identified as playing a vital part in the infection-cycle. Ecological studies are of great importance in all such insect-transmitted infections; only by knowing all the necessary conditions for survival of an infective agent can we know when and where to redouble our precautions against spread of infection to new areas and when and where we may safely relax them. In our present state of knowledge the maxim should be "safety-first."

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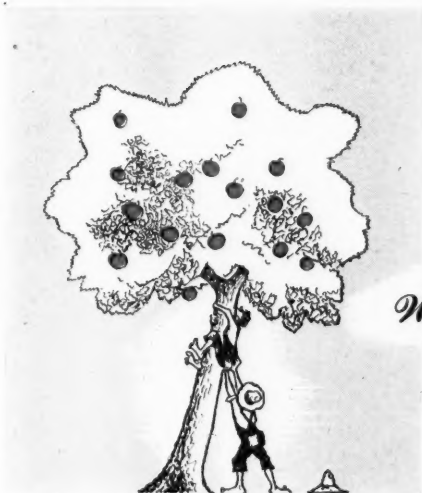
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